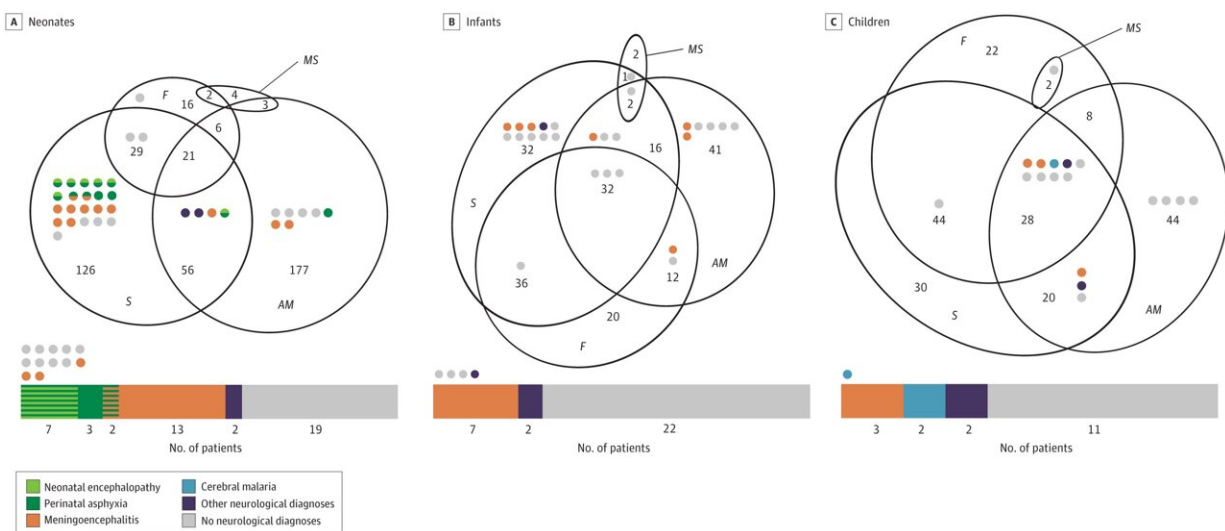


# Neurological symptoms are common—and similar—in severely ill children with different conditions, finds study

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Patients With Neurological Signs and Fever and Their Overlap. Credit: *JAMA Network Open* (2024). DOI: 10.1001/jamanetworkopen.2024.31512

In low and middle-income countries (LMICs), severely ill children often present neurological manifestations prior to death, which are linked to a variety of diseases that can be treated. Lumbar punctures, which can help to identify the causes of these neurological symptoms and prevent deaths, are seldom used. These are the main conclusions of a study led by the Barcelona Institute for Global Health (ISGlobal) and [published](#) in

*JAMA Network Open.*

When children suddenly show [neurological symptoms](#), they need urgent medical help. LMICs have the highest number of these cases but lack the necessary resources for proper diagnosis and treatment. So far, understanding the reasons behind these medical emergencies mainly depends on clinical assessments and family reports after a child's death.

This study was done within a network focused on preventing child deaths, called the CHAMPS Network. A team led by Quique Bassat, ICREA researcher and ISGlobal General Director, analyzed data from more than 3,000 deceased children in seven LMICs to identify what neurological symptoms were present prior to the death and correlate them with the cause of death.

To determine the latter, the CHAMPS network uses a minimally invasive tissue sampling technique (MITS) developed and validated by ISGlobal researchers, which consists in obtaining small tissue samples and bodily fluids (blood, [cerebrospinal fluid](#)) after death and analyzing them using advanced histopathological and microbiological tests.

## **Clinical evaluations are not enough**

Of the 1,330 children who had neurological evaluations recorded, over half of them (727 out of 1,330, or 54.7%) showed neurological symptoms before their death. The most common confirmed causes of death were: [lack of oxygen](#) to the brain (23.2%); infections of the brain like meningitis and encephalitis (10.2%); and cerebral malaria (5.11%).

The neurological symptoms were very similar across different diagnoses, and [clinical manifestations](#) were unable to differentiate the main underlying causes. Among neonates, the most important syndromes presenting similar manifestations were hypoxic events and meningitis,

and in children, the most similar presentations were in children with cerebral malaria and meningitis.

However, only 18% of children with meningitis had a [lumbar puncture](#) (a crucial diagnostic test) conducted prior to [death](#). This is because of several reasons, including lack of resources to perform lumbar punctures, a lack of capacity or laboratory infrastructures to test the cerebrospinal fluid, and the lack of clear guidelines.

"Neurological symptoms are common in very ill children in LMICs, but it is impossible to determine the exact cause without performing complementary tests," says Sara Ajanovic, ISGlobal researcher and first author of the study. The study shows that lumbar punctures are seldom performed in LMICs, and in more than half of the study settings, they were practically unavailable.

"Sadly, this places these settings very far from achieving the goals within the WHO Roadmap to Defeat Meningitis by 2030. Improving the early diagnosis of neurological emergencies is essential to reduce child mortality rates," she adds. The authors point out that nearly 90% of deaths following neurological symptoms were preventable.

"The CHAMPS network gives us a unique opportunity of creating knowledge about the underlying causes of neurological emergencies among [children](#) in LMICs," concludes Bassat.

**More information:** Sara Ajanovic et al, Neurological Symptoms and Cause of Death Among Young Children in Low- and Middle-Income Countries, *JAMA Network Open* (2024). [DOI: 10.1001/jamanetworkopen.2024.31512](#)

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